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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/806,387	03/23/2004	Takashi Yamamoto	2635-207	1834

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EXAMINER	
OLSEN, KAJ K	

ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/806,387	YAMAMOTO ET AL.	
	Examiner	Art Unit	
	KAJ K. OLSEN	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 September 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/5/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakae et al (USP 6,340,419) in view of Garvie et al (USP 4,067,745) or King ("Chemical Polish and Strength of Alumina", Materials Science Research, 1966, pp. 529-538). In this modified rejection, King replaces the previous use of Scott. King is the article cited by Scott (col. 1, ll. 57-63) that formed the basis for the use of Scott in the previous rejection.

3. Nakae discloses a gas sensor element comprising a sensor portion having a solid electrolyte member 100 with first and second surfaces having electrodes (11, 12) mounted thereto. Nakae also discloses a heater member having a heating element 160 and one and other surfaces where said sensor portion is integrally laminated on one surface of the heater member and where the other surface of the heater member is contactable to the target gas. See fig. 1 and 2; col. 4, ll. 25-35; and col. 5, ll. 33-50. Nakae does not explicitly disclose that the other surface of the heater member, which is constructed out of alumina, has the specified average roughness. Both Garvie and King teach that polished alumina surfaces have greater mechanical strength than unpolished alumina and increase the lifetime of devices constructed with the alumina. See Garvie, fig. 7 and col. 6, ll. 27-40 and King, tables I and II and the text on p. 537. It would have

been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of either Garvie or King and polish the exposed alumina surface (i.e. the other surface) of Nakae so as to improve the mechanical strength of the underlying alumina surface. With respect to the average roughness being no more than 1.71 microns, finding the appropriate level of polishing to arrive at the desired level of strengthening requires only routine skill in the art. It is noted that Garvie indicates that the strengthening continually improves the as a function of the smoothness of the alumina (see fig. 7) and King suggested polishing until the surface was "highly reflective" (p. 531, final paragraph) thereby motivating one to utilize an extremely fine polishing (i.e. polishing until the surface roughness is less than 1.71 microns).

4. With respect to the new limitation concerning the behavior of a water drop when it falls onto the other surface, the present invention evidences that this is an inherent result of a polished alumina surface. Hence, this limitation does not appear to further define any structure of the sensor element, but only describe an additional advantage of the use of polishing. "[I]t is well settled that a patent cannot be granted for an applicant's discovery of a result, even though it may be unexpectedly good, which would flow logically from the teaching of the prior art" *In re Rau*, 117 USPQ 215.

5. With respect to the at least part having the specified surface roughness being no less than 90 percent of all of the area of the other surface, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to polish all of the bottom surface of Nakae so as to garner the complete strengthening effect that polishing has. Furthermore, because the other surface of Nakae is planar (see fig. 1), polishing the entire bottom surface would be as easy as polishing only a portion of the surface.

6. With respect to the other external surfaces of the heater member, polishing the other lateral surfaces of elements 15 and 16 of Nakae would allow the side surfaces to be strengthened as well.

7. Claims 1, 2, 4, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakae in view of Hata et al (USP 7,108,827).

8. Addressing claim 7 first, Nakae discloses preparing a sensor portion having a solid electrolyte member 100 with first and second surfaces having electrodes (11, 12) mounted thereto. Nakae also discloses preparing a heater member having a heating element 160 and one and other surfaces, laminating the sensor portion to the heater portion and firing the integrally laminated sensor portion and heater member. See fig. 1 and 2; col. 4, ll. 25-35; col. 5, ll. 33-50; and col. 6, ll. 32-37. Nakae does not explicitly recite anything about the base member utilized for the firing step and hence doesn't disclose the use of a base member having a surface roughness of no more than 8.55 microns. Hata teaches in an alternate firing process for zirconia structures that the base members 3 that the green elements are placed upon for firing should be polished fine down to a surface roughness of less than 5 or 2 microns so that the green sheets being fired slide readily on the them while they shrink during the firing. See fig. 1 and col. 9, ll. 8-20. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize a base member for Nakae that is polished down to at least 8.55 microns surface roughness as taught by Hata so that the green layers of Nakae do not stick during the firing process. Although Hata only explicitly recites that the spacers 3 should be polished, because layer 3a also has green sheets placed on it like spacers 3 (see fig. 1), one possessing ordinary skill in the art would also have been motivated to polish all base member surfaces in

contact with the green sheets, including members 3a and 3b of Hata, so that all surfaces of the greens sheet are permitted to freely slide.

9. With respect to the new limitation concerning the behavior of a water drop when it falls onto the other surface, the present invention evidences that this is an inherent result of a polished alumina surface. Hence, this limitation does not appear to further define the process of the manufacture of the sensor element, but only describe an additional advantage of the use of the process. "[I]t is well settled that a patent cannot be granted for an applicant's discovery of a result, even though it may be unexpectedly good, which would flow logically from the teaching of the prior art" *In re Rau*, 117 USPQ 215.

10. With respect to claims 1 and 2, Nakae already set forth all the limitations of the claim, but did not explicitly disclose the specified surface roughness. However, as the instant invention evidences, the use of a base member having a surface roughness of less than 8.55 microns would inherently have produced an other surface for the heater member having an average surface roughness of less than 1.71 microns. See "(Second Example)" on pp. 18-20. Because Hata already rendered obvious the use of a base member with a surface roughness of less than 8.55 microns (see above), then Nakae prepared with such a base member would have inherently resulted in an average surface roughness of less than 1.71 microns.

11. With respect to the new limitation of claim 1, the present invention evidences that this is an inherent result of a polished alumina surface. Hence, this limitation does not appear to further define any structure of the sensor element, but only describe an additional advantage of the use of polishing. "[I]t is well settled that a patent cannot be granted for an applicant's discovery of a

result, even though it may be unexpectedly good, which would flow logically from the teaching of the prior art" *In re Rau*, 117 USPQ 215.

12. With respect to claim 4, the use of polishing to arrive at the less than 1.71 microns constitutes the process of making the device. The determination of patentability for the claim is based on the product itself. Because the product of the claim is identical to the invention of Nakae and Hata, the process from which it was made is the same as or obvious over the process utilized by Nakae and Hata (see *In re Thorpe*, 777 F.2d 695, 698).

13. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakae in view of Kato et al (USP 6,156,175) and either Garvie or King.

14. Nakae discloses preparing a sensor portion having a solid electrolyte member 100 with first and second surfaces having electrodes (11, 12) mounted thereto. Nakae also discloses preparing a heater member having a heating element 160 and one and other surfaces, laminating the sensor portion to the heater portion and firing the integrally laminated sensor portion and heater member. See fig. 1 and 2; col. 4, ll. 25-35; col. 5, ll. 33-50; and col. 6, ll. 32-37. Nakae does not explicitly disclose the step of cooling the fired sensor portion. Kato discloses that a cooling step immediately follows the firing (i.e. sintering) step. See col. 12, ll. 11-36. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to cool the sensor as taught by Kato so that the sensor can then be further processed before sensor installation. With respect to the step of treating the other surface of the heater member, both Garvie and King teach that polished alumina surfaces have greater mechanical strength than unpolished alumina. See Garvie, fig. 7 and col. 6, ll. 27-40 and tables I and II and the text of p. 537. It would have been obvious to one of ordinary skill in the art at the time the invention was

being made to utilize the teaching of either Garvie or King and polish the exposed alumina surface (i.e. the other surface) of Nakae and Kato so as to improve the mechanical strength of the underlying alumina surface. With respect to the average roughness being no more than 1.71 microns, finding the appropriate level of polishing to arrive at the desired level of strengthening requires only routine skill in the art. It is noted that Garvie indicates that the strengthening continually improves the as a function of the smoothness of the alumina (see fig. 7) and King suggested polishing until the surface was "highly reflective" (p. 531, final paragraph) thereby motivating one to utilize an extremely fine polishing (i.e. polishing until the surface roughness is less than 1.71 microns).

15. With respect to the new limitation concerning the behavior of a water drop when it falls onto the other surface, the present invention evidences that this is an inherent result of a polished alumina surface. Hence, this limitation does not appear to further define the process of the manufacture of the sensor element, but only describe an additional advantage of the use of the process. "[I]t is well settled that a patent cannot be granted for an applicant's discovery of a result, even though it may be unexpectedly good, which would flow logically from the teaching of the prior art" *In re Rau*, 117 USPQ 215.

16. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakae in view of Kato, Garvie or King, and Hata.

17. Claim 8 appears to comprise the combined process limitations of claims 5 and 7 (i.e. it combines the cooling and treating of claim 5 with the base member having a surface roughness of less than 8.55 microns of claim 7). However, Nakae and Kato already set forth the process of preparing the sensor portion and heater member, firing the sensor portion and heater member,

and cooling. See the rejection of claim 5 above. Hata already set forth the obviousness of utilizing a base member for firing that has been polished down to less than 5 or 2 microns surface roughness for the purpose of allowing the ceramic green sheets to freely slide on the base member during firing. See the rejection of claim 7 above. Finally, Garvie and King render obvious the use of treating (i.e. polishing) alumina surfaces so as to improve their strength. See the rejections of claims 1 and 5 above. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the combined processes of both Hata and Garvie or King to provide a base member that permits the fired green sheets to freely slide during firing and to provide sensor having a strengthened alumina base member.

18. With respect to the new limitation concerning the behavior of a water drop when it falls onto the other surface, the present invention evidences that this is an inherent result of a polished alumina surface. Hence, this limitation does not appear to further define the process of the manufacture of the sensor element, but only describe an additional advantage of the use of the process. "[I]t is well settled that a patent cannot be granted for an applicant's discovery of a result, even though it may be unexpectedly good, which would flow logically from the teaching of the prior art" *In re Rau*, 117 USPQ 215.

Response to Arguments

19. On a preliminary note, the examiner acknowledges the Japanese office action and the teaching of JP 2002-174,167 (hereafter "JP '167") cited on the 11/05/2008 IDS. Although JP '167 teaches the use of ten point average surface roughness of no more than 1.71 μm for a surface of the sensor, as near as the examiner can ascertain from the machine translation

(enclosed herein), the purpose of this surface roughness was to improve the adhesion of the heat resistant board 13 to the gas reception element film to thereby further reduce the heating time. See par. 0015, 0064 and 0065. Hence, JP '167 only teaches polishing the a surface of the heater equivalent to the *one surface* and does not teach nor render obvious a sensor having the claimed surface roughness on the *other surface* as defined by claims 1, 5, 7, and 8. The Japanese office action indicated that claim 3 could not be rejected with this reference and claim 3 defines that one of the surfaces being polished is the other surface.

20. Applicant's arguments filed 9-24-2008 have been fully considered but they are not persuasive. Applicant urges that none of the teachings of King, Garvae, or Hata taught anything concerning the behavior of a water droplet onto the polished surface. However, it is noted that this limitation of the claims does not further define the constructed sensor element or the method of manufacture of the sensor element, but rather a property of the sensor that has such a polished surface. Hence, if the prior art renders obvious the use of polishing of that surface (as the examiner maintains Garvie and King do) or if the prior art renders obvious the use of a mount surface having the set forth roughness (as the examiner maintains that Hata does), then the now set forth result of that process would have been inherent. The fact that applicant uses polishing for a different purpose does not alter the conclusion that polishing in a prior art device would be *prima facie* obvious from the purpose disclosed in the references. Furthermore, "since motivation to combine prior art references need not be identical to that of Applicant in order to establish obviousness" *In re Kemps*, CAFC 40 USPQ 2d, (1996).

Conclusion

21. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KAJ K. OLSEN whose telephone number is (571)272-1344. The examiner can normally be reached on M-F 5:30-2:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kaj K Olsen/
Primary Examiner, Art Unit 1795
January 13, 2009